



# Link Calculator

## Quick Start Guide

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# Creating a Calculation

This section describes creating a link calculation of a simple Point to Point wireless setup. We will enter radio, antenna, and location information of both ends of the link, and the calculator will generate a report describing the feasibility of the link.

After logging in, the Input Parameters section will be displayed.

The screenshot shows the LigoWave Link Calculator interface. At the top, there is a navigation bar with 'Parameters', 'Maps', and 'Results' tabs. The 'Parameters' tab is active. Below the navigation bar, there are buttons for 'View Saved Links' and 'Logout'. A user greeting 'Welcome back, Matt' is visible in the top right corner. The main content area is divided into several sections:

- TX SITE:** Includes fields for Name (Pine Log), Radio Type (LigoPTP 3-18 R2), Latitude (39 28 30.08 N), Longitude (94 34 3.56 W), Antenna Info (Height: 70 feet (AGL), Gain: 18 dBi), and TX Power (18 dBm).
- RX SITE:** Includes fields for Name (May St), Radio Type (LigoPTP 3-18 R2), Latitude (39 22 48.83 N), Longitude (94 38 0.54 W), Antenna Info (Height: 70 feet (AGL), Gain: 18 dBi), and RX Threshold (-92 dBm).
- OTHER PARAMETERS:** Includes Frequency (3650 MHz), Polarization (Horizontal/Vertical), Misc. Loss (e.g. cable loss) (0 dBm), Site Climate (Continental Temperate), Units (English System/Metric System), and ITU Rain Rate (0.01%) (0 mm/hr (optional)).

A 'Calculate Link' button is located at the bottom center of the form. The footer of the page reads 'Copyright LigoWave 2009'.

1. Enter the Name of each site
2. Select the radio type (if available) for each side. This will automatically fill in the frequency, transmit power, and antenna gain of the radio. If not available, select *Custom*
3. Enter Longitude / Latitude for each location
4. Enter the Height (Above Ground Level) for each antenna
5. Enter the antenna gain (if not populated when selecting Radio Type)
6. Enter the transmit power (if not populated when selecting Radio Type)
7. Enter the RX Threshold (the minimum receive signal level the link will work with)
8. Enter the frequency of the radio (if not populated when selecting Radio Type)
9. Choose Polarization of the antenna
10. Enter any additional loss (cable losses, etc)
11. Choose Site Climate
12. Select unit of measurement (English vs Metric)
13. Enter the ITU Rain Rate

Click the *Calculate Link* button to display results

After a few moments, the results of the link calculation will be displayed.



With this you will see:

- Total Path Loss – How much signal has been lost due to distance & obstructions
- Signal Level at the RX site – the expected signal level you should receive if antennas are aligned properly
- EIRP – Displays the EIRP of the current transmitter and antenna
- Thermal fade margin – The difference between the expected signal level and the minimum RX Threshold
- Distance Between Sites (in km or miles)
- Link availability due to rain – Based on the ITU rain rate previously entered, this will tell you the link availability due to expected rain fade
- Download Report – Generates a downloadable / printable PDF report of the link results

There is also a graphical representation of the link and any natural obstacles that may be obstructing the path.

- The green area represents any mountains or hills that may occur along the path of the link.

There are also three lines that compose the RF link.

- The orange line is the Line of Sight path, a straight line directly between radios
- The blue line represents 60% of the Fresnel zone. If this is obstructed, you will probably have problems with your link (lower signal, packet loss, etc)
- The purple line represents the Fresnel zone. If there are obstructions in this path, it may have an impact on the reliability / performance of the link.